

THIS OPINION WAS NOT WRITTEN FOR PUBLICATION

The opinion in support of the decision being entered today (1) was not written for publication in a law journal and (2) is not binding precedent of the Board.

Paper No.15

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

Ex parte DANIEL E. WILLIAMS and ABRAHAM H. GHAPHERY

Appeal No. 1997-0558
Application 08/013,813

ON BRIEF

Before HAIRSTON, HECKER, and FRAHM, Administrative Patent Judges.

FRAHM, Administrative Patent Judge.

DECISION ON APPEAL

Appellants have appealed to the Board from the examiners' final rejection of claims 1 to 26, which constitute all of the pending claims in the application before us on appeal.

BACKGROUND

The subject matter on appeal is directed to an active vehicle suspension control method and apparatus which senses an operating characteristic of a corner having an actuator, takes a difference

between a desired and a measured operating characteristic, and controls a variable gain amplifier to output an actuator control signal to drive the actuator in response to the determined difference wherein the gain is related to a "frequency of variations" of the difference.

Representative claim 1 is reproduced below:

1. An apparatus for controlling a vehicle suspension having a sprung mass and an unsprung mass, said apparatus comprising:

a plurality of actuators, each corner of the vehicle having an associated actuator operatively connecting the sprung mass with its associated unsprung mass;

means for sensing at least one operating characteristic of a selected corner;

means for providing a desired actuator drive signal in response to said at least one sensed operating characteristic for achieving a desired operating characteristic for the selected corner;

means for determining the difference between said at least one sensed operating characteristic and the desired operating characteristic for the selected corner;

control means responsive to said determined difference for providing an actuator control signal having a value functionally related to said difference, said control means having a variable gain amplifier means for outputting said actuator control signal, wherein the gain of said variable gain amplifier means is controlled in response to a frequency of variations of said determined difference; and

actuator control means for driving said actuator in response to said actuator control signal.

The following references are relied on by the examiner:

Williams et al. (Williams)	4,625,993	Dec. 2, 1986
Doi et al. (Doi '650)	4,787,650	Nov. 29, 1988
Klinger et al. (Klinger)	4,809,179	Feb. 28, 1989
Doi et al. (Doi '632)	4,916,632	Apr. 10, 1990
Kurosawa	4,924,393	May 8, 1990

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Kamimura et al. (Kamimura)	5,033,770	Jul. 23, 1991
Lizell	5,097,419	Mar. 17, 1992

Claims 1, 2, 4, 9, 10, 19, 20, and 22 stand rejected under 35 U.S.C. § 103. As evidence of obviousness, the examiner relies upon Kurosawa in view of Doi '632, Doi '650, and Lizell. With regard to claims 3 and 21, the examiner additionally relies upon Williams.

Claims 5, 6, 8, 12, 13, 15, 17, 18, 23, 24, and 26 stand rejected under 35 U.S.C. § 103. As evidence of obviousness, the examiner relies upon Kurosawa in view of Doi '632, Doi '650, Lizell, and Kamimura. With regard to claims 7, 11, 14, 16, and 25, the examiner additionally relies upon Klinger.

Rather than repeat the positions of appellants and the examiner, reference is made to the Briefs and the Answer for the respective details thereof.

OPINION

For the reasons generally set forth by appellants in the briefs (Brief, pages 8 to 14; Reply Brief, page 2), and for the reasons which follow, we will reverse the rejections of claims 1 to 26 under 35 U.S.C. § 103. In reaching our conclusion on the issues raised in this appeal, we have carefully considered appellants' specification and claims, the applied prior art, and the respective viewpoints of appellants and the examiner. As a consequence of our review, we are in general agreement with appellants that the applied references would neither have taught nor suggested the active vehicle suspension control method and apparatus of claims 1 to 26 on appeal.

At the outset, we note that, in accordance with appellants' statement at page 4 of the principal brief, appellants make no objection to claims 1 to 26 being grouped together for purposes of this appeal. Thus, we are in agreement with the examiner's statement at the top of page 2 of the Answer, that all of the claims on appeal stand or fall together. We select claim 1 as being representative of claims 1 to 26, all of the claims on appeal. See 37 CFR § 1.192(c)(7).

Representative claim 1 on appeal specifically requires a "control means having a variable gain amplifier means for outputting said actuator control signal, wherein the gain of said variable gain amplifier means is controlled in response to a frequency of variations of said determined difference" (claim 1) (emphasis added). The examiner admits that the primary reference to Kurosawa "does not disclose variable gain of the amplifier in response to a frequency of variation of the predetermined difference as claimed" (Answer, pages 3 to 4). The examiner cites Doi '632 and Doi '650 as teaching variable gain amplifiers in vehicle suspension control systems (Answer, page 4), and relies upon Lizell to teach or suggest adaptive control. The examiner then asserts that Lizell "obvious[ly][sic] implies the adaptive control circuit adjusts the gains in response to the frequency of variation of the determined difference" (Answer, pages 4 to 5), and therefore "[t]he prior art clearly disclose the claimed feature of adjusting gain in response to a frequency of variation of the difference signal" (Answer, page 5). We

cannot agree with the examiner's leap of logic as to Lizell, and we find that the examiner has failed to show that Lizell would have taught or suggested the salient feature of appellants' representative claim 1 on appeal of controlling gain "in response to a frequency of variations of said determined difference" as recited.

Appellants argue that "[n]o disclosure nor suggestion is made by Lizell [’419] of a variable gain amplifier for providing an actuator control signal in which the gain is controlled in response to a frequency of variations of a determined difference signal" (Brief, page 11) (emphasis in original), as required by representative claim 1 on appeal. We agree, and we find that this feature is neither taught nor would have been suggested by Lizell, taken singly or in any combination with the other applied references. We have carefully reviewed all of the portions of Lizell cited by the examiner as teaching or suggesting controlling gain in response to a determined difference, and we do not find, as the examiner asserts, that "the adaptive loop controls the vehicle suspension in response to the frequency of variation of the difference" (Answer, page 12) (emphasis added).

Specifically, Lizell's adaptive loop 240 has a disturbance identifier 242 which sets a variable gain for each vehicle corner "which is based on the frequency and amplitude of the estimated suspension velocities" (column 19, lines 25 to 26). Thus, we find that Lizell controls the variable gain in relation to the frequency of only a desired operating characteristic, and not a difference between a desired and a measured operating characteristic. Thus, we agree with appellants' cogent statement at

page 2 of their Reply Brief, that in Lizell "any gain adjustment is based on velocity frequency" and that "[t]here is no teaching nor even the remote suggestion of controlling the gain of a variable []gain [sic] amplifier in response to a frequency of variations of a determined difference between a sensed operating characteristic and desired operating characteristic" as claimed.

We agree with appellants that "even if combined, none of the four references used by the Examiner [Kurosawa, Doi '632, Doi '650, and Lizell] teaches use of a variable gain amplifier means for outputting an actuation control signal where the gain of the amplifier is controlled in response to frequency variations of a difference value of operating characteristics" (Brief, page 14) (emphasis in original). Because none of the applied references teaches this salient feature which is recited in each of claims 1 to 26 on appeal, and because each of the rejections of claims 1 to 26 on appeal relies upon these four base references, we cannot sustain the rejections of claims 1 to 26 under 35 U.S.C. § 103.

CONCLUSION

The decision of the examiner rejecting claims 1, 2, 4, 9, 10, 19, 20, and 22 under 35 U.S.C. § 103 over Kurosawa, Doi '632, Doi '650, and Lizell is reversed.

The decision of the examiner rejecting claims 3 and 21 under 35 U.S.C. § 103 over Kurosawa, Doi '632, Doi '650, Lizell, and Williams is reversed.

The decision of the examiner rejecting claims 5, 6, 8, 12, 13, 15, 17, 18, 23, 24, and 26 under

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35 U.S.C. § 103 over Kurosawa, Doi ‘632, Doi ‘650, Lizell, and Kamimura is reversed.

The decision of the examiner rejecting claims 7, 11, 14, 16, and 25 under 35 U.S.C. § 103 over Kurosawa, Doi ‘632, Doi ‘650, Lizell, Kamimura, and Klinger is reversed.

REVERSED

KENNETH W. HAIRSTON
Administrative Patent Judge

STUART N. HECKER
Administrative Patent Judge

ERIC FRAHM

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